NetCam SC

VANDAL RESISTANT DOME

User's Manual

www.stardot.com

StarDot® Technologies

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Chapter 1 Configuration

Congratulations on your purchase of a StarDot NetCam SC Dome network camera with integrated web server. The NetCam SC Dome combines the best of the analog CCTV world (auto iris, mechanical day/night IR filter*, video out, 24VAC/12VC power inputs) with the best of the digital IP camera world (up to 5 megapixel, Power over Ethernet, integrated video motion detection).

With proper usage, the NetCam SC Dome will provide many years of quality video. We recommend that you read this manual carefully to completely understand the camera's capabilities. Throughout this manual, your NetCam SC Dome camera will also be referred to as simply NetCam SC.

* Mechanical Day/night IR filter available only on IR models.

1.1 Before You Start

This manual guides you through the basic setup procedure for the NetCam SC and provides a detailed resource of the camera's advanced options and capabilities.

1.2 What's Included and What's Required

The basic package includes:

- NetCam SC, lens, StarDot Tools CD and Manual, L-wrench, Gasket, Wall Mount Screws with anchors, Dome Case Screws with O-ring, and Mounting Template.

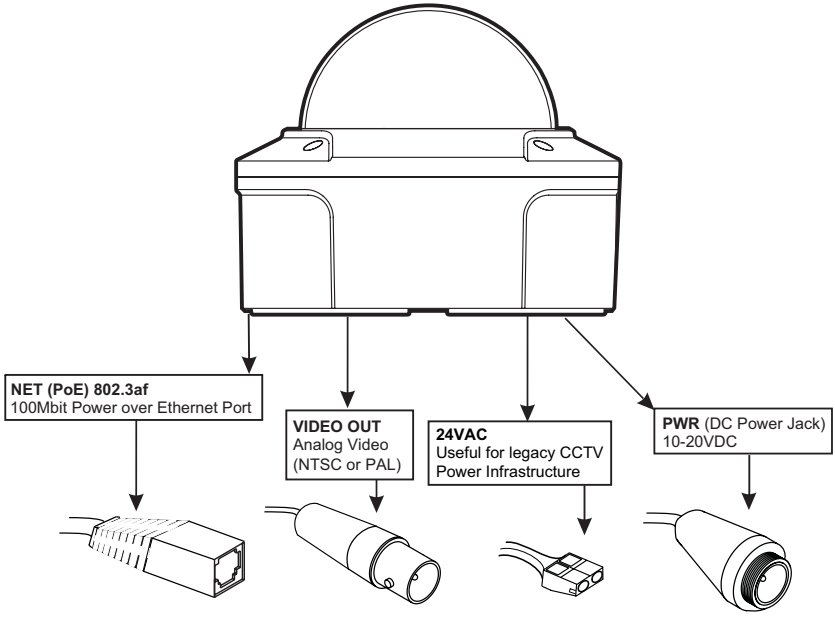
Since the NetCam SC is a PoE device (Power over Ethernet), it is assumed that most users will provide their own CAT 5 or CAT 6 cable, as well as a PoE switch or power injector. StarDot optionally offers a wall mount, a power supply, a combination network/power cable and a null serial configuration cable. In order to use the NetCam SC, you will need the following:

- Power source (PoE, 12VDC or 24VAC)
- A computer – for configuring NetCam SC and for viewing video

Note: *A computer is not necessary to operate NetCam, only to configure it.*

- Network connectivity (LAN, cable modem, DSL, T-1, Dial-Up Internet Account, Satellite Modem, etc.)

1.3 Parts of NetCam SC



1.4 Connecting NetCam SC to a Network

The StarDot Tools software can be used to find the camera's IP address or to configure the camera with the Setup Wizard (optional).

❶ Install the StarDot Tools software by inserting the CD-ROM and running `setup.exe` (it should run automatically).

❷ Connect NetCam SC into a PoE switch or injector with a standard CAT 5 network cable or with a StarDot Combo Ethernet/Power Cable.

❸ If your network has a router or server that automatically assigns IP addresses (DHCP), StarDot Tools will find the camera's IP address and display it in the software. To access NetCam SC, simply double-click its IP address. If the IP address is displayed, skip to Chapter 3.

❹ If no DHCP server is present, the NetCam SC will auto assign itself a "zeroconf" IP address, which will always start with 169.254. You can temporarily assign your computer a similar address and use StarDot Tools to find the camera's IP address and assign it a new permanent IP address. To do so, give your PC the IP address 169.254.100.100 with a subnet of 255.255.0.0.

1.5 An Overview of Network Connectivity

A LAN or network connection is the simplest configuration for NetCam SC. NetCam SC simply needs an IP address (and other networking parameters) to make the live images and configuration menus accessible from any web browser on the network. There are two ways NetCam SC can be assigned an IP address: automatically or manually.

Automatic IP Assignment (DHCP)

NetCam SC is shipped in an automatic IP assignment mode called DHCP (Dynamic Host Configuration Protocol). If your network has a DHCP server (in most cases, a router), it will automatically assign the necessary network parameters to NetCam SC. Before you can access the camera, you will need to know which IP address was assigned. Use the StarDot Tools software to find the camera's IP address.

Automatic IP Assignment (zeroconf)

If no DHCP server is present, the NetCam SC will automatically assign itself a "zeroconf" IP address, which will always start with 169.254. You can temporarily assign your computer a similar address and use StarDot Tools to find the camera's IP address and assign it a new permanent IP address. To do so, give your PC the IP address 169.254.100.100 with a subnet of 255.255.0.0. Use the StarDot Tools software to find the camera's IP address.

Manual IP Assignment

If you want to assign the camera a permanent IP address, you will need the following information:

- IP Address (example: `192.168.1.5`)
- Subnet Mask (example: `255.255.255.0`)
- Gateway (example: `192.168.1.1`)
- DNS Servers (obtain from ISP)

If you are installing the camera on a company network, you will probably want to get this information from the system administrator.

If NetCam SC is connected to a network with a DHCP server and your computer is not running Windows, you can log into your router (or whatever is acting as your DHCP server) and view the DHCP clients table. NetCam SC will have a MAC address starting with 00:30:F4. Take note of the IP address and enter it in your web browser. Click on the configuration link, visit the network tab and assign the camera a manual IP address (outside of the router's DHCP range).

Chapter 2 Installation

Before installing the camera in its final location, it is important to configure and test it first (see Chapter 1).

2.1 Installing NetCam SC

Measure the distance from the camera to the nearest Ethernet hub or switch. This distance should not exceed 330 feet (100 meters). If you wish to extend the distance further than 330 feet (100 meters), you can add an Ethernet hub or switch.

- Choose the optimal location for your NetCam SC. Make sure that the location you choose can withstand approximately 12.6 lbs (5.7 kg).
- During the installation process, allow ample room for the wiring to avoid jamming the wires or stripping the wire insulation, as this may cause an electrical and/or fire hazard.
- During installation, items may fall and cause damage or injury. Make sure to create a safe work environment by clearing your work area from all nonessential items and personal.

There are three ways to power NetCam SC. This allows you go install the camera in virtually any existing infrastructure. **NOTE: Only use one method to power the camera. Do not plug two or more power sources into the camera simultaneously.**

Power over Ethernet (PoE)

Run standard CAT 5 or better Ethernet cable from a PoE hub/ switch (or PoE power injector) into the NET jack on the back of NetCam SC. NetCam SC will run off the PoE power running in the CAT 5 cable. No other power source is required.

Separate Ethernet and Power

If you decide not to use PoE, you can connect one end of a CAT 5 or better Ethernet cable into a hub/switch and the other end into the NET jack on the back of NetCam SC. Plug a 12VDC 1A power supply into the back of NetCam SC (or you may use a 24VAC power supply and connect it to the input marked 24VAC).

StarDot's Power/Network Cable

If you choose not to power NetCam SC via PoE and you still want the take advantage of a single cable run, StarDot provides Power/Network cable that allows you to run both power and data in the same cable. Visit http://www.stardot.com for more information.

2.2 Installing NetCam SC to Pipe/Wall/Ceiling

NOTE: *To maintain IP66 weatherproofing, make sure to close up all unused mounting holes with the provided screws and O-rings.*

- Use the shown holes [A] in figure 1 if you are mounting the dome directly to a ceiling or wall.
- Use the shown holes [B] in figure 1 if you are mounting the dome directly to a wall mount adapter (Wall mount adapter not included).
- Use the shown holes [C] in figure 1 if you are mounting the dome directly to a junction box (Junction box and gasket not included).

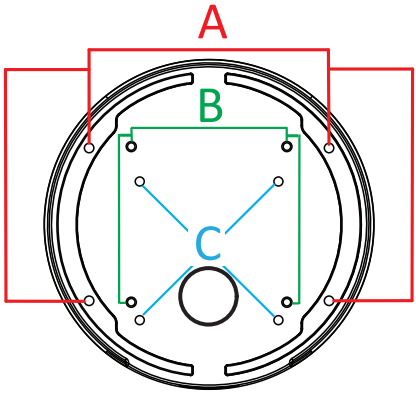


Figure 1

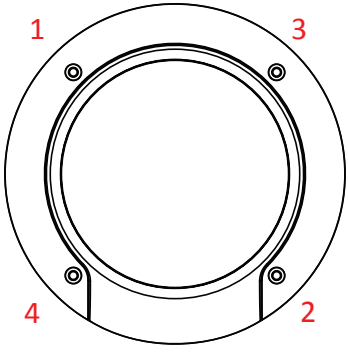


Figure 2
(Screw Pattern)

2.3 Installing NetCam SC Bottom to a Pipe

NOTE: *To maintain IP66 weatherproofing, make sure to close up all unused mounting holes with the provided screws and O-rings.*

- Remove the cap bolt and O-ring (if installed) by using a coin or slotted screw driver and pass the desired wiring through the back of the dome.
- Connect the desired wiring and pull the wires through and into the pipe.
- Thread the dome onto the pipe. Make sure to completely cover the pipe threads with Teflon tape to maintain weatherproofing.
- During the installation of the dome onto the pipe, make sure that the wiring does not get stuck to the Teflon tape, as this may cause unnecessary damage to the wires and/or dome circuitry.
- Once the dome is secured to the pipe, you can adjust the direction and focus of the lens.
- To adjust the lens, remove the dome cover by undoing the four cover screws with the supplied L-wrench.
- Adjust the lens by pointing it in the desired direction. Use caution while adjusting the lens as the lens assembly will pan and tilt with little effort. Using excessive force may cause damage to the lens assembly.
- Adjust the focus by rotating the lens focusing mechanism until the desired focus is achieved. Depending on the type of lens used, you may need to loosen and then tighten the lens locking screw to complete this process.
- Once you have finalized your adjustments, reassemble the dome cover by reinstalling the four bolts with the provided L-wrench. To maintain IP66 weatherproofing, make sure to securely tighten the bolts so that there is little to no gap between the dome cover and dome base. For an easier installation, tighten the screws by using a crisscross screw pattern as shown in *Figure 3*.

2.4 Installing NetCam SC Side to a Pipe

NOTE: *To maintain IP66 weatherproofing, make sure to close up all unused mounting holes with the provided screws and O-rings.*

- Remove the side mounted cap bolt and O-ring (if installed) by using a coin or slotted screw driver.
- Pass the wiring assembly through the side pipe hole.
- Close the bottom wire hole with the cap bolt and O-ring that was removed from the side mounted pipe hole.
- Connect the desired wiring and pull the wires through and into the pipe.
- Thread the dome onto the pipe. Make sure to completely cover the pipe threads with Teflon tape to maintain weatherproofing.
- During the installation of the dome onto the pipe, make sure that the wiring does not get stuck to the Teflon tape, as this may cause unnecessary damage to the wires and/or dome circuitry.
- Once the dome is secured to the pipe, you can adjust the lens and focus.
- To adjust the lens, remove the dome cover by undoing the four cover screws with the supplied L-wrench.
- Adjust the lens by pointing it in the desired direction. Use caution while adjusting the lens as the lens assembly will pan and tilt with little effort. Using excessive force may cause undo damage to the lens assembly.
- Adjust the focus by rotating the lens focusing mechanism until the desired focus is achieved. Depending on the type of lens used, you may need to loosen and then tighten the lens locking screw to complete this process.
- Once you have finalized your adjustments, reassemble the dome cover by reinstalling the four bolts with the provided L-wrench. To maintain IP66 weatherproofing, make sure to securely tighten the bolts so that there is little to no gap between the dome cover and dome base. For an easier installation, tighten the screws by using a crisscross screw pattern as shown in *Figure 2*.

2.5 Installing NetCam SC Side to Ceiling

NOTE: *To maintain IP66 weatherproofing, make sure to close up all unused mounting holes with the provided screws and O-rings.*

- Attach the provided template to the desired mounting area.
- Drill a hole 5 mm in diameter and at least 35 mm in depth.
- Insert the plastic screw anchor provided. Repeat for all four mounting holes.
- Connect the desired cables and make sure that they will not get caught or damaged during the installation process.
- Remove the dome cover by undoing the four cover screws with the supplied L-wrench.
- Mount the dome onto the ceiling by using mounting holes [A] as shown in *Figure 1*. If you are drilling a wiring hole in the ceiling/wall, make sure that the hole diameter is within 30 mm. To maintain IP66 weatherproofing, make sure to also use and correctly align the provided gasket with the hole to insulate the ceiling/wall and dome base.
- Once the dome is secured to the ceiling/wall, you can adjust the lens and focus.
- To adjust the lens, remove the dome cover by undoing the four cover screws with the supplied L-wrench.
- Adjust the lens by pointing it in the desired direction. Use caution while adjusting the lens as the lens assembly will pan and tilt with little effort. Using excessive force may cause undo damage to the lens assembly.
- Adjust the focus by rotating the lens focusing mechanism until the desired focus is achieved. Depending on the type of lens used, you may need to loosen and then tighten the lens locking screw to complete this process.
- Once you have finalized your adjustments, reassemble the dome cover by reinstalling the four bolts with the provided L-wrench. To maintain IP66 weatherproofing, make sure to securely tighten the bolts so that there is little to no gap between the dome cover and dome base. For an easier installation, tighten the screws by using a crisscross screw pattern as shown in *Figure 2*.

2.6 Installing NetCam SC Side to Wall

NOTE: *To maintain IP66 weatherproofing, make sure to close up all unused mounting holes with the provided screws and O-rings.*

Since the NetCam SC uses a two axis gimbal, we recommend using a wall mount (Part Number: MNT-VWAL) for this type of wall installation. (Wall Mount is not included)

- Follow Wall Mount instructions to install wall mount (Part Number: MNT-VWAL).
- Connect the desired cables and make sure that they will not get caught or damaged during the installation process.
- Remove the dome cover by undoing the four cover screws with the supplied L-wrench.
- Mount the dome onto the ceiling by using mounting holes [A] as shown in *Figure 1*. If you are drilling a wiring hole in the ceiling/wall, make sure that the hole diameter is within 30 mm. To maintain IP66 weatherproofing, make sure to also use and correctly align the provided gasket with the hole to insulate the ceiling/wall and dome base.
- Once the dome is secured to the ceiling/wall, you can adjust the lens and focus.
- To adjust the lens, remove the dome cover by undoing the four cover screws with the supplied L-wrench.
- Adjust the lens by pointing it in the desired direction. Use caution while adjusting the lens as the lens assembly will pan and tilt with little effort. Using excessive force may cause undo damage to the lens assembly.
- Adjust the focus by rotating the lens focusing mechanism until the desired focus is achieved. Depending on the type of lens used, you may need to loosen and then tighten the lens locking screw to complete this process.
- Once you have finalized your adjustments, reassemble the dome cover by reinstalling the four bolts with the provided L-wrench. To maintain IP66 weatherproofing, make sure to securely tighten the bolts so that there is little to no gap between the dome cover and dome base. For an easier installation, tighten the screws by using a crisscross screw pattern as shown in *Figure 2*.

2.7 Removing the Internal Camera Assembly

Removing the internal camera assembly will give you access to the internal mounting holes [B,C] shown in *Figure 1* and the interior of the dome base area. The internal camera assembly does not need to be removed to access the internal mounting holes for [A].

- Remove the dome cover by undoing the four cover screws with the supplied L-wrench.
- Locate and unscrew the two screws on the internal camera assembly connecting it to the base as shown in *Figure 4*. Do not detach the screws from their base.
- Locate the two plastic tabs shown in *Figure 4*. Gently push them towards the center of the dome as shown in *Figure 4* and pull the internal camera assembly away from the base to finalize the removal process.
- To reinstall the internal camera assembly, line up the internal camera assembly with the proper mounting holes and gently push it into the dome base until the plastic tabs click into place.
- Retighten the two screws. Do not over tighten as this may crack the mounting holes on the internal camera assembly.
- Reassemble the dome cover by reinstalling the four bolts with the provided L-wrench. To maintain IP66 weatherproofing, make sure to securely tighten the bolts so that there is little to no gap between the dome cover and dome base. For an easier installation, tighten the screws by using a crisscross screw pattern as shown in *Figure 2*.

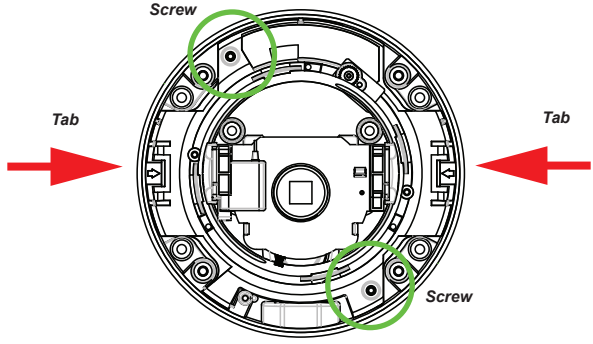
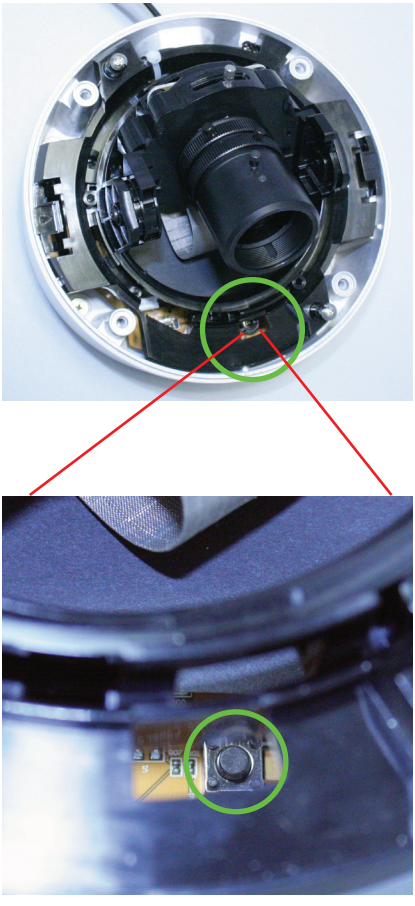


Figure 4

2.8 Resetting Camera

You can reset the camera to the original factory setting by depressing and holding the reset button found inside the camera as shown in *Figure 5* and *Figure 6*.



Figures 5 and 6

2.9 Connecting Serial Port Cable (RS-232) to Camera

- Remove the dome cover by undoing the four cover screws with the supplied L-wrench.
- Locate and unscrew the two screws on the internal camera assembly connecting it to the base as shown in *Figure 4*. Do not detach the screws from their base.
- Locate the two plastic tabs shown in *Figure 4*. Gently push them towards the center of the dome as shown in *Figure 4* and pull the internal camera assembly away from the base to finalize the removal process.
- Locate the serial port connector shown in Figure 7.

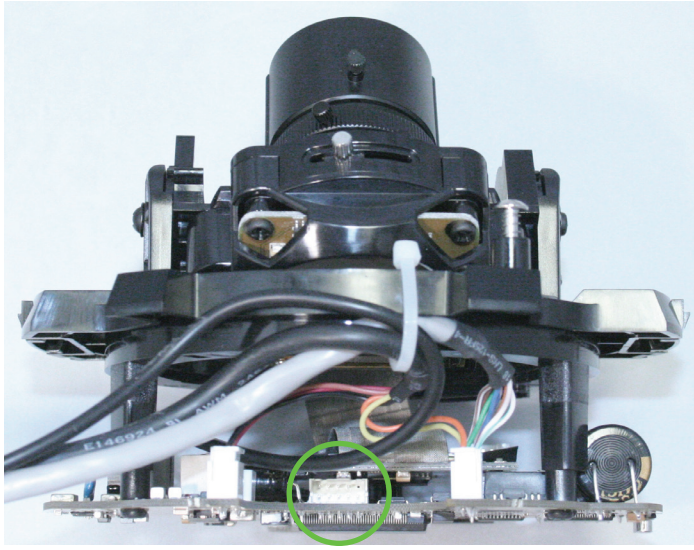


Figure 7

To reinstall the internal camera assembly, line up the internal camera assembly with the proper mounting holes and gently push it into the dome base until the plastic tabs click into place.

- Retighten the two screws. Do not over tighten as this my crack the mounting holes on the internal camera assembly.
- Reassemble the dome cover by reinstalling the four bolts with the provided L-wrench. To maintain IP66 weatherproofing, make sure to securely tighten the bolts so that there is little to no gap between the dome cover and dome base. For an easier installation, tighten the screws by using a crisscross screw pattern as shown in *Figure 2*.

Chapter 3 Accessing NetCam SC

3.1 Viewing NetCam SC's Images

Any Java or Javascript-enabled browser can be used to view the live images. Type NetCam SC's IP address in your browser's address bar (example: http://192.168.1.5), or use StarDot Tools to Find the camera's IP address.

Window Size

For most viewing, the window size should be set to 100%, which is a pixel to pixel match of the image resolution. If you select 50%, the width and height will be resized by the browser to 50% of the actual image resolution. If you select 200%, the width and height will be resized by the browser to 200% of the actual image resolution. This does not affect the actual image resolution which is set on the image configuration menu (Section 3.3).

Mode

This determines which method is used to watch the live video:

Javascript - the default viewing mode, works on nearly all browsers, including iPhone. For higher speeds, use Java or ActiveX

Pull - Java applet "pulls" the live images via web port (usually80)

Push - Java applet receives motion JPEG stream via port 8001

ActiveX - receives motion JPEG stream via port 8001

.NET - receives motion JPEG stream via web port (usually 80)

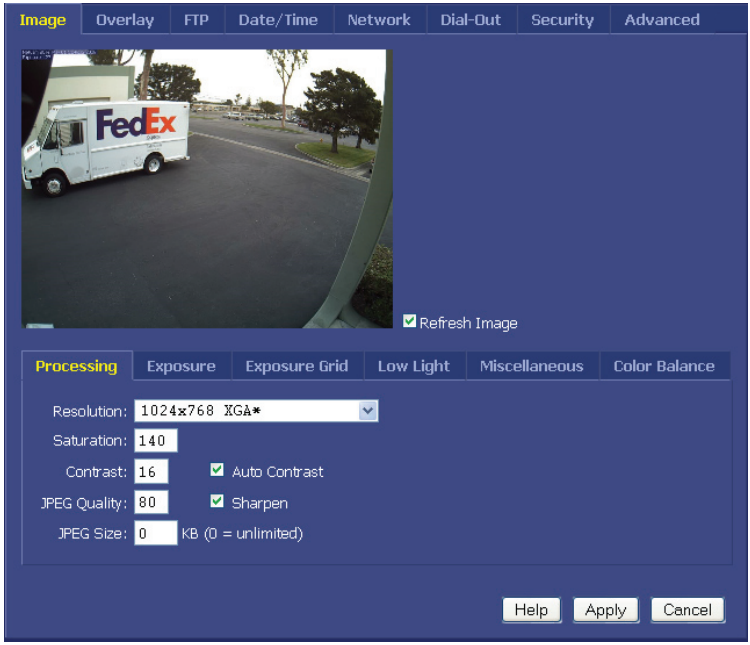
3.2 NetCam SC's Configuration Menus

Virtually any web browser can be used to access NetCam SC's configuration menus. To access these menus, type NetCam SC's IP address in your browser's address bar (example: `http://192.168.1.5`). This will bring up the live image page. Click on the Config link. You will be prompted for a User Name and Password. Use `admin` for both.

Tip: *We highly recommend that you change the default password. To do so, see the section on Security Properties in this chapter.*

3.3 Image Properties

All image-related configuration options are located on the Image Properties page. After making changes, click the Apply button to save new settings in the camera.



PROCESSING

Resolution

Resolution is the dimensional size of the NetCam SC image, measured in pixels, horizontal by vertical. The higher the resolution, the larger the picture appears in your browser, and the longer it takes to download. Some resolutions, such as portrait and HD, crop the image. The resolution marked with an asterisk (*) denotes the default quarter resolution image.

Tip: *As with most digital cameras, NetCam SC achieves the highest quality and clearest images at quarter resolution. This is due to the way color is calculated with digital image sensors. The largest "high quality" image on the NetCam SC 5MP is 1296x960.*

Saturation

This represents the amount of color in the image. The higher the number, the more saturated the color.

Contrast

This represents the amount of haze subtraction. The higher the value, the more haze is subtracted and the image results in higher contrast. Using the Auto Contrast function is recommended over setting the contrast manually.

Auto Contrast

Haze subtraction is automatically determined by the camera. Enabling Auto Contrast is recommended.

JPEG Quality

The JPEG Quality is a balance between lossy image compression and image quality. The higher the number, the less compression artifacts in the image, but the bigger the file size. **A value higher than 80 is not recommended, as it greatly increases the file size with very little noticeable difference in image quality.**

Sharpen

When enabled, sharpening is performed on the video. For the best image quality, Sharpen should be enabled.

JPEG Size

Limits the each JPEG frame to a specific size (in KB). This is useful for limiting bandwidth and increasing frame rate.

EXPOSURE

Auto vs. Manual

Unless you have a controlled (fixed) lighting condition, you will almost always want to leave Auto Exposure enabled.

Auto Exposure

Enabling Auto Exposure causes NetCam SC to automatically adjust the image exposure based on the overall brightness of the image. The following functions are only implemented when Auto Exposure is enabled.

- **Brightness** - The higher the number, the brighter the picture. This is the target for the auto exposure code.
- **Sync** - Fluorescent lighting refreshes at 60 Hz or 50 Hz, depending on what country you live in. This may interfere with the camera's exposure. Set the sync to the appropriate value for your area (example: U.S. is 60 Hz). If you are pointing the camera outdoors or do not use fluorescent lighting, turn this option off.

Manual Exposure

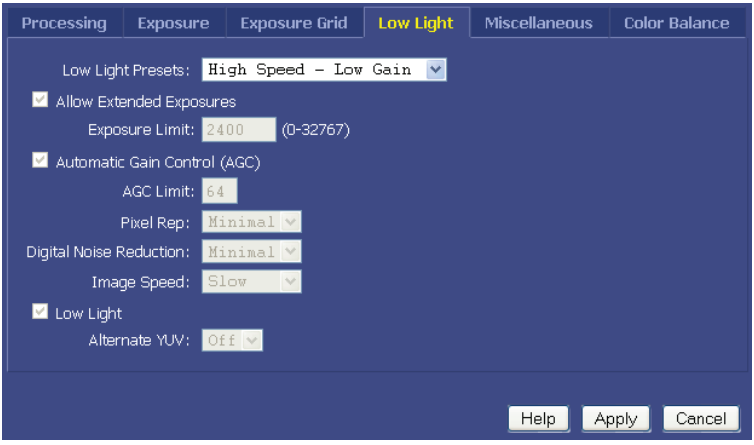
Enabling Manual Exposure causes the camera to expose images at the value placed in the Exposure field. Keep in mind that using manual exposure is not advised for outdoor imaging, since the light conditions are constantly changing. You may opt to use manual exposure indoors if your lighting conditions do not change. Here are some sample values and their fractional and decimal equivalents:

48 = 1/1000 second (0.001)
96 = 1/500 second (0.002)
248 = 1/200 second (0.005)
480 = 1/100 second (0.01)
800 = 1/60 second (0.01666)
960 = 1/50 second (0.020)
1600 = 1/30 second (0.0333)
3200 = 1/15 second (0.0666)*
6000 = 1/8 second (0.125)*
12000 = 1/4 second (0.25)*
24000 = 1/2 second (0.5)*
32767 = 0.68 seconds (maximum exposure)*
** may introduce pixel noise*

EXPOSURE GRID

When Auto Exposure is enabled, NetCam SC adjusts the exposure of the image based on the average brightness of the pixels located in the selected regions in the Exposure Grid. If you want the camera to determine the exposure based on only the sky, you would select the squares that apply to the sky (click the View Grid button to see the grid over the image). Conversely, if you'd like the exposure to be determined by the foreground, select only those squares. This is comparable to the spot exposure on a traditional camera.

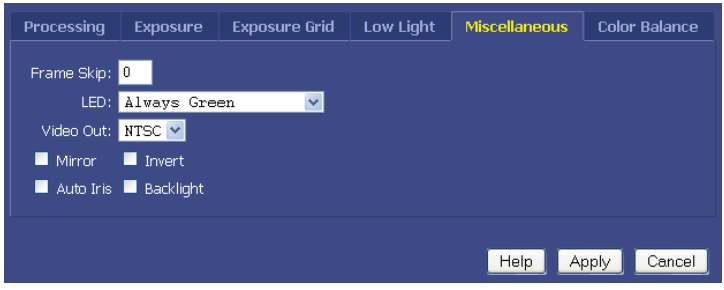
LOW LIGHT



- **Low Light Presets** - There are a lot of controls in determining how the camera behaves in low light conditions. To simplify low light use, a number of Low Light Presets are available to instantly configure the camera as required. The presets automatically set all the other controls. If you'd like to manually set the advanced controls select "Manual" in the Low Light Presets drop-down.
- **Allow Extended Exposures** - In darker lighting conditions, a longer exposure produces a brighter image. A longer exposure also produces an image where objects in motion may appear blurry. If your application requires the best possible image quality and motion blur is not a concern, enable Allow Extended Exposures and set the Exposure Limit to a high value (up to 32767). If your application requires capturing images of people or objects in motion, disable Allow Extended Exposures.
- **Exposure Limit** - The camera will not expose the image sensor above this value. The default is 32767 (about 0.7 seconds). A higher value will make the camera more light sensitive in low light at the expense of motion blur.

- **Automatic Gain Control (AGC)** - The picture is digitally amplified in low light conditions or in situations where the exposure is limited to reduce motion blur. Enabling AGC may introduce image noise.
- **AGC Limit** - The higher the limit, the more digital amplification occurs (assuming it's necessary). If you want to limit the digital gain to reduce noise on the image, reduce this value.
- **Pixel Rep** - Groups pixels together for better light sensitivity, at the expense of image clarity.
- **DNR (Digital Noise Reduction)** - Reduces image noise using digital algorithms.
- **Image Speed** - Determines when low light gain is initiated in relation to the exposure.
- **Low Light** - In low light conditions, the analog low light mode of the image sensor is enabled. Enabling Low Light may introduce image noise.
- **Alternate YUV** - Uses non-standard algorithms to process color, allowing for improved light sensitivity.

MISCELLANEOUS



Frame Skip

To lower the frame rate (and bandwidth), increase this value. A value of 0 means full frame rate, a value of 1 means skip every other frame, a value of 2 means skip every two frames (See also JPEG size under the section for Processing).

LED

The LED indication on the front of the camera can be configured in a number of different ways:

- **Off** - LED is always off. Useful when you do not want the camera to be seen at night or if you are experiencing a visible reflection in a window.
- **Always Green** - LED remains green when camera is on.
- **Green-Yellow Active** - LED remains green until image activity occurs (viewing, recording, FTP, etc.), in which case it momentarily blinks yellow.
- **Green-Red Motion** - LED remains green until internal video motion is detected, in which case it momentarily blinks red.
- **Green-Red-Yellow** - A combination of Green-Yellow Active and Green-Red-Motion.

Video Out

Controls video out BNC port on the back of the camera. It can be turned off (no video out) or set to NTSC or PAL. When set to NTSC or PAL, the camera's video can be viewed with any standard video monitor. Note: the video resolution will be scaled up or down to the maximum NTSC or PAL resolution. On the 5 megapixel model, turning the Video Out off will increase the maximum frame rate at 2592x1944 from 7.5 fps to 10 fps.

IR (only available on IR models)

This determines how the mechanical IR (infrared) filter behaves.

- **Off** - The camera will only see visible light.
- **On** - The camera will see both visible and infrared light.
- **Auto** - The camera will automatically determine what position the IR filter should be in (IR is normally only needed in low light situations). If you plan on using the IR mode (on or auto), an IR illuminator is recommended.

Mirror

Flips the video horizontally. When combined with Invert, the video is rotated 180°.

Invert

Flips the video vertically. When combined with Flip, the video is rotated 180°.

Auto Iris

If your camera has a DC auto iris lens connected, you may enable this option. If your camera has a manual iris lens, do not enable this option.

Back Light

Backlight compensation (BLC) adjusts the picture in situations where a bright light source, such as window, is causing the image to be improperly exposed.

COLOR BALANCE

Auto Color Balance

Enabling Auto Color Balance causes NetCam SC to automatically adjust the color balance of the image based on the content of the image. In most situations, you will want Auto Color Balance enabled.

Auto Color Balance Type

- Average - An average of the entire image is used to determine color balance.
- Bright - Only bright areas are used to determine color balance.
- Spot - Only spot areas are used to determine color balance.
- Automatic - The camera automatically selects the best method to use.

R - This represents the amount of red skew in the image.

G - This represents the amount of green skew in the image.

B - This represents the amount of blue skew in the image.

The recommended setting is Auto Color Balance with Average selected.

Manual Color Balance

Enabling Manual Color Balance causes the camera to use the manual Red, Green and Blue values to set the color balance of the image. You may want use manual color balance if you have a fixed lighting situation.

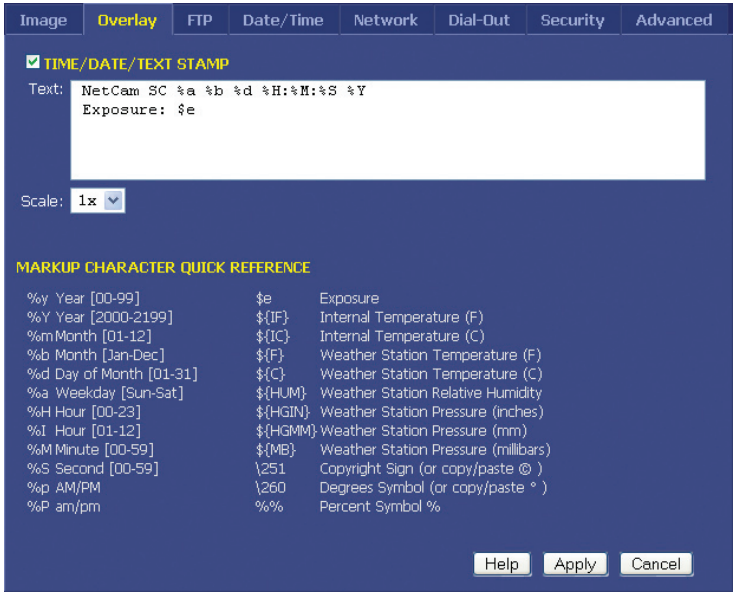
R - This represents the amount of red in the image.

G - This represents the amount of green in the image.

B - This represents the amount of blue in the image.

3.4 Overlay Properties

The Overlay Properties page allows you to edit the text displayed on the image. After making changes, click the Apply button to save the settings in the camera.



Text

Any text entered into this field will be stamped onto the live image. Camera location and copyright information are two examples. In addition to static text, the current date and time, as well as internal camera parameters, can all become part of the text on the live image. This is handled through markup characters. For instance, `%d` inserts the current day of the month on the live image. There is a complete list of markup characters below and a mini reference on the Overlay page itself.

Default: `NetCam SC %a %b %d %H:%M:%S %Y`
`Exposure: $e`

Scale

The size of the font can be scaled from 1x (smallest size) to 4x (largest size). The larger fonts sizes are useful for high resolution images that are being resized smaller on a web page.

Markup Character Reference

All of the following markup characters can be used in the text overlay. Additionally, any date/time markups (preceded by the `%` character) can be used to compose the filenames in the FTP Properties Page, which is very useful for archiving images with unique filenames (based on the current date and time, for instance).

Date Markups

`%Y`	Year, Four-Digit [2000-2199]
`%y`	Year, Two-Digit [00-99]
`%m`	Month, Numerical [01-12]
`%B`	Month, Full [January-December]
`%b`	Month, Abbreviated [Jan-Dec]
`%U`	Week of Year (Starting with Sunday) [00-53]
`%W`	Week of Year (Starting with Monday) [00-53]

%d	Day of Month [01-31]
%w	Day of Week, Numerical (Sunday=0) [0-6]
%u	Day of Week, Numerical (Monday=1) [1-7]
%A	Day of Week, Full [Sunday-Saturday]
%a	Day of Week, Abbreviated [Sun-Sat]
%j	Day of Year (Julian Day) [001-366]
%p	AM/PM, Uppercase
%P	am/pm, Lowercase
${Z}	Time zone

Time Markups

%H	Hour, Military [00-23]
%I	Hour, Standard [01-12]
%M	Minute [00-59]
%S	Second [00-59]
$[	Milliseconds [000-999]

Date & Time Shortcut Markups

%D	Date String [mm/dd/yy]
%r	Time String [HH:MM:SS AM/PM]
%T	Time String, Military [HH:MM:SS]

Symbol Markups

\260	Degree Sign, º
\251	Copyright Sign, ©
\256	Registered Sign, ®
\261	Plus-Minus Sign, ±
%%	Percentage Character, %

Camera Markups

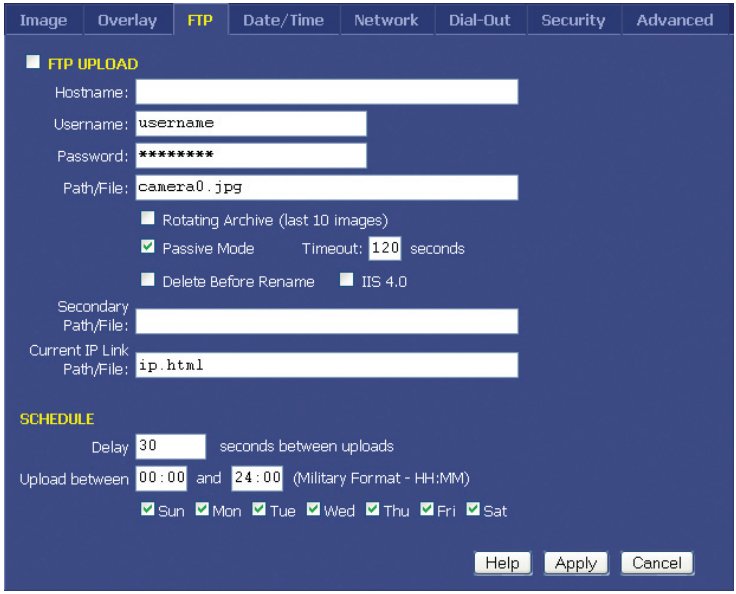
`$e`	Camera Exposure
`${IF}`	Internal Camera Temperature, in Fahrenheit
`${IC}`	Internal Camera Temperature, in Celsius
`${F}`	Weather Station Temperature, in Fahrenheit
`${C}`	Weather Station Temperature, in Celsius
`${HUM}`	Weather Station Relative Humidity
`${MB}`	Weather Station Pressure in Millibars (hPa)
`${HGIN}`	Weather Station Pressure in Inches of Mercury
`${HGMM}`	Weather Station Pressure in Millimeters of Mercury
`$n`	Frame Number
`$u`	Camera Uptime
`${IPADDR}`	IP Address
`${HWADDR}`	MAC Address
`${VERSION}`	Firmware Version Number
`${PRODUCT}`	Product Type

NetCam SC supports much of the ISO 8859-1 character set, which is very useful for adding foreign language text to NetCam SC's overlay. For a full list, visit http://www.stardot.com/netcam/netcam-overlay.html

In most cases, you can also copy and paste characters from other applications.

3.5 FTP Properties

The FTP Properties instruct NetCam SC to upload images to a remote server. After making changes, click the Apply button to save the settings in the camera.



FTP Upload

FTP stands for File Transfer Protocol, one of the most popular methods for transferring files over the Internet. In addition to camera serving images from its internal web server, it can also upload images to an external web server. This is useful if you plan on having a large number of visitors viewing the live images or if you'd like to archive every image the camera takes. To enable image uploads, check FTP Upload on and fill out the options below.

Required Fields

Hostname

The hostname is the name of the server where you'd like the camera to upload images to. It can be a machine name or IP address. Do not include the `http://` or `ftp://` header or a path.

Example: `example.com` or `ftp.example.com`

Username

This is the username or login name assigned to you by your hosting company.

Password

This is the password assigned to you by your hosting company.

Path/File

This field combines two elements, the image filename, preceded by an optional path or directory. Consult with your hosting company to determine if you need to specify a path. If you don't, you simply put the desired name of the image file here.

Example Without Path: `camera.jpg`
Example With Path: `/html/images/camera.jpg`

Advanced Fields

Rotating Archive

If enabled, the camera will use a renaming scheme to store the last 10 images on your server. A hyphen, followed by the archive number (0-9) is automatically appended to the end of the filenames.

Default: Off

Passive Mode

If NetCam SC is behind a proxy server, enable passive mode. If you are unsure if you need passive mode, it is usually safe to enable it anyway.

Default: On

Timeout

If the FTP transfer is unsuccessful, NetCam will abort and re-initiate the process after the specified amount of seconds.

Default: `120`

Delete Before Rename

NetCam SC employs a file renaming scheme, which greatly reduces the possibility of file collisions between the camera uploading an image and viewers downloading the image. The image is uploaded with a `.tmp` extension. Once uploaded the tmp file is renamed without the `.tmp` extension. Certain FTP/Web servers do not allow a file to be renamed to a filename that already exists. To get around this problem, enable Delete Before Rename.

Default: Off

IIS 4.0

Some FTP servers lock a file when a file with the same filename is constantly uploaded and renamed. If you have problems seeing your image update on your web site, try enabling the IIS 4.0 option. This option is only valid if Delete Before Rename (above) is also enabled.

Default: Off

Secondary Path/File

NetCam SC can optionally upload the image with a separate path and/or filename from the Path/File above. This provides a very convenient way to archive images on your server while still maintaining a statically named live image. One way to do this is to include date/time markup characters as part of the filename. The current upload time of the image will become the filename.

For example, the filename `%Y-%m-%d-%H%M%S.jpg` automatically translates to `2009-06-01-153015.jpg` if the date and time of the upload is June 1, 2009 at 3:30:15 PM.

Tip: *For a complete list of Date/Time markup characters, click the Help button on the Overlay page.*

Example Without Path:

```
netcam-%Y-%m%d-%H%M%S.jpg
```

Example With Path:

```
public_html/netcam-%Y-%m%d-%H%M%S.jpg
```

Only the characters beginning with the percentage symbol (`%`) are valid. It not advisable to use date/time characters that insert `/ \ :` or space characters, as this can confuse the FTP/Web server.

Current IP Link Path/File

If NetCam SC is using an external modem to dial out to an ISP, it will most likely be assigned a different IP address every time it connects. This makes it next to impossible to access the camera directly from a browser since its IP address is not known. To eliminate this problem, the camera can upload a small web page every time an image is uploaded. The web page contains the current IP address of the camera so you can configure the camera remotely. Clear this field if you don't want this file to be uploaded.

Default: `ip.html`

Schedule

Scheduling tells NetCam SC when and how often to FTP images to your server.

Delay

This tells the camera to delay a specified number of seconds between FTP image uploads. The speed at which the camera can upload varies on the image resolution, amount of JPEG compression, Internet connection and network congestion. Keep in mind that the overhead of FTP doesn't allow for the same update rates that you see when accessing the camera directly with a browser or through NVR software.

Default: 30

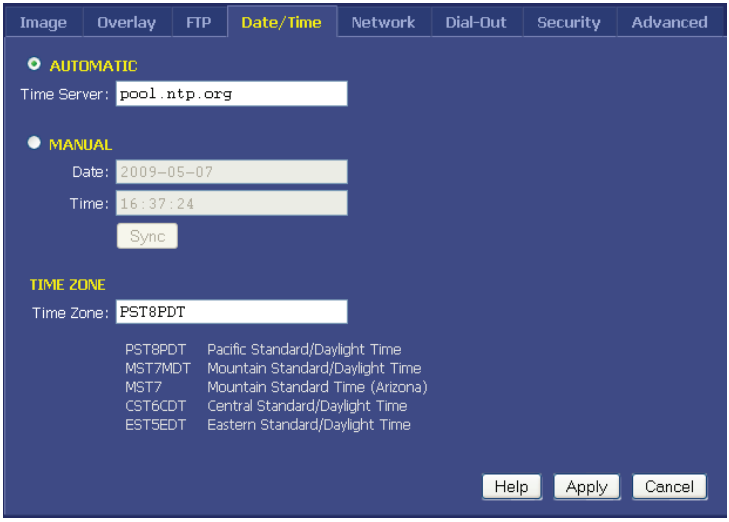
Upload Window

NetCam SC can upload images 24 hours a day, seven days a week, or you can set whatever time window and days of the week you like. Use military time for the beginning and ending window times.

Example: You can configure NetCam SC to only upload Between 07:30 and 18:30 only on Monday, Tuesday, Wednesday, Thursday and Friday.

3.6 Date/Time Properties

The Date/Time Properties allow you to set the camera's date and time. After making changes, click the Apply button to save the settings.



Setting the Date and Time

Automatic vs. Manual - For the most accurate date and time, having the camera automatically synchronize with a network time server is recommended.

Automatic Time Set

When Automatic time synchronization is enabled, the camera will query a network time server and synchronize the camera's date and time, usually accurate to within seconds or less. This will happen every time the camera is powered on or rebooted, provided it is connected to the Internet or a network with a time server.

- **Time Server** - The name (or IP address) of a time server is entered here. Some popular ones include:

```
pool.ntp.org
tock.usno.navy.mil
time-b.nist.gov
```

Note: *While these time servers have proved reliable over the years, there is no guarantee that they will always be available to the public.*

Manual Time Set

If you don't have access to a time server, you may opt to manually set the camera's clock. You can do this in one of two ways. Using the Sync button, you can synchronize the camera's clock to your PC's clock. You may also manually modify the time and date in the Date/Time box. In either case, be sure to hit the Apply button after you've set the time.

TIME ZONE

NetCam SC integrates your current time zone into the time/date string and can even automatically adjust for daylight savings time. Type in the time zone code from the list on this page. If your time zone is not listed, enter your abbreviated time zone followed by the number of hours you are behind GMT (if you're ahead of GMT, add the "-" character before the value).

HST10	Hawaiian Standard Time
AT10ADT	Aleutian Standard/Daylight Time (Alaska, parts)
YST9YDT	Yukon Standard/Daylight Time (Alaska, parts)
PST8PDT	Pacific Standard/Daylight Time
MST7MDT	Mountain Standard/Daylight Time
MST7	Mountain Standard Time (Arizona)
CST6CDT	Central Standard/Daylight Time
EST5EDT	Eastern Standard/Daylight Time
AST4ADT	Atlantic Standard/Daylight Time
NST3:30NDT	Newfoundland Standard/Daylight Time
WET0WETDST	Western European Standard/Daylight Time
PWT0PST	Portuguese Winter/Summer Time
MEZ-1MESZ	Mitteleuropaeische Zeit/Sommerzeit
MET-2METDST	Middle European Standard/Daylight Time
SAST-2SADT	South African Standard/Daylight Time
JST-9	Japan Standard Time
WST-8:00	Australian Western Standard Time
CST-9:30	Australian Central Standard Time
CST-9:30CDT	Australian Central Standard/Daylight Time
EST-10	Australian Eastern Standard Time
EST-10EDT	Australian Eastern Standard/Daylight Time
NZST-12NZDT	New Zealand Standard/Daylight Time

3.7 Network Properties

The Network Properties page contains all the IP configuration information for setting up NetCam SC on a network. After making changes, click the Apply button to save the settings in the camera.

Ethernet

If your network is Ethernet-based (LAN, cable modem, DSL), use the NET port on the back of NetCam SC to access the camera. The first step to network access is assigning NetCam SC an IP address. There are two ways in which this can be done: automatically (DHCP) or manually.

IP Assignment

DHCP

By default, NetCam SC boots up in DHCP mode, meaning that it probes the network for a DHCP server. If there is a DHCP server on the network, the camera is automatically assigned an IP address, subnet mask, gateway, and name servers. No manual configuration is needed. One negative of DHCP mode is not knowing which IP address the camera was given. Use the StarDot Tools software to find DHCP-assigned cameras on your local network.

Manual

If you'd like to manually assign an IP address, set the camera to Manual and provide the following information:

- **IP Address** - The IP address you'd like to assign the camera. Consult your network administrator to determine which IP address
  to use. If you are setting up the camera behind a residential gateway or cable/DSL router, your IP address will probably be something similar to `192.168.1.5`.
- **Subnet Mask** - Find out your netmask from your network administrator. If you're on a private network, your netmask will almost always be `255.255.255.0`.
- **MAC Address** - This is the factory-set Ethernet address of the camera. It also serves as the Camera ID (serial number). It cannot be changed.

Network

Hostname

Alphanumeric name of the camera that can get linked to its IP address. This is disabled if DHCP is enabled.

Default: `netcamsc`

Gateway

In most cases, this is a machine name or IP address that serves as a gateway to the Internet. If the camera is on a private network behind a router/gateway, you would enter the IP address of the router/gateway. This is disabled if DHCP is enabled.

Domain Name Servers (DNS)

Domain name server IP address. This is critical if your FTP server and/or time server is entered as a domain name and not an IP address. Check with your ISP to determine your name servers (you can list up to three). This is disabled if DHCP is enabled.

Web Server Port

The default web server port is `80`. A situation that calls for changing the port number is if you're hosting one or more cameras behind a router that supports port forwarding. This allows you to access multiple cameras behind a single public IP address.

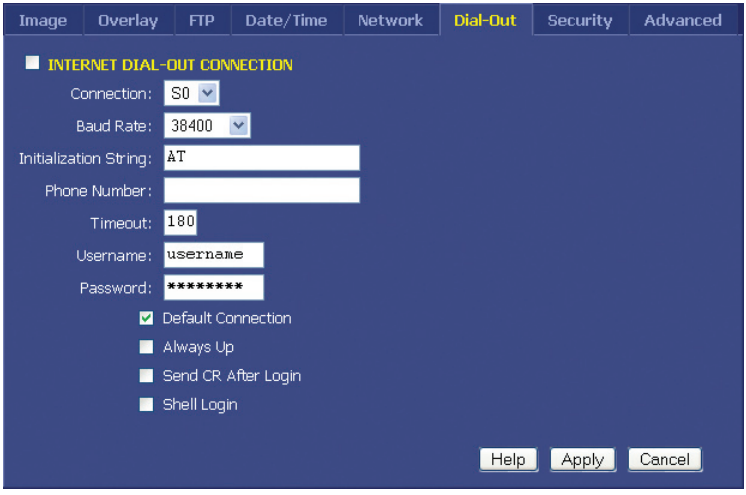
Example: *Assign the camera a web server port of 8085. In your router, under the port forwarding section, route port 8085 to the camera's IP address.*

Use caution when changing the web server port number. If it's anything but 80, you will need to add `<:port number>` to the end of the IP address when browsing (example: `http://192.168.1.5:8085`).

Default: `80`

3.8 Dial-Out Properties

The Dial-Out Properties page contains all the ISP dial-up configuration information for setting up NetCam SC on a dial-up modem. After making changes, click the Apply button to save the settings in the camera.



Internet Dial-Out Connection (PPP)

If NetCam SC's primary connection to the Internet will be a dial-up modem connection to the Internet, enter your ISP (Internet Service Provider) account information here.

Check this option on if you'd like the camera to use an external modem to dial the Internet.

Baud Rate

This represents the speed or baud rate at which the camera will communicate with the external modem. For most dial-up accounts, a baud rate of 38400 or 19200 works best.

Default: 38400

Initialization String

This is a string that configures your modem before dialing the Internet. The default string works fine in most cases.

Default: `AT`

Phone Number

The phone number of the ISP (Internet Service Provider). You can embed special characters in the phone number.

`,` = pause one second
= same as # button on phone
`*` = same as * button on phone

Timeout

NetCam SC will attempt to dial up the ISP for the specified number of seconds. If NetCam SC is unable to connect during this time period, it will stop and start over again.

Default: `180`

Username

The username or login assigned to you by your ISP.

Password

The password assigned to you by your ISP.

Default Connection

Enabling this option makes the ISP dial-out connection NetCam SC's default connection to the Internet.

Default: On

Always Up

If enabled, NetCam SC will attempt to stay continuously connected to the Internet. If disconnected, it will automatically attempt to reconnect. If NetCam SC is configured to upload images to a server via FTP, it is not necessary to enable this option; NetCam SC will automatically attempt to dial into the Internet when an image is scheduled to upload if dial-out is enabled.

Default: Off

Send CR After Login

This advanced ISP option tells NetCam SC to send a CR (Carriage Return) after logging in. Most ISP's do not require this.

Default: Off

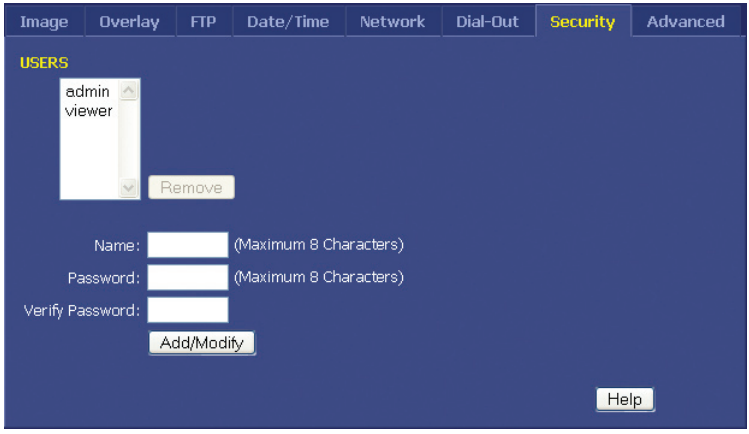
Shell Login

This advanced ISP option tells NetCam SC to perform a shell login. Most ISP's do not require this.

Default: Off

3.9 Security Properties

The Security properties page contains user/password information for securing NetCam SC from unwanted visitors.



NetCam SC Users

NetCam SC has its own multi-user capable, password protected operating system. By default, the live images can be viewed by anyone and only the configuration pages are password protected. However, these options can be changed.

admin - The *admin* user has configuration and viewing rights. **It is strongly recommended that you change the default password (initially "admin") to something else.** This will prevent anonymous users from logging into the camera and making changes. Choose a password that cannot be easily guessed. The password can be a combination of alpha and numeric characters, upper and lowercase (maximum 8 characters).

Tip: *Use a password that cannot be easily guessed (maximum 8 characters).*

---

viewer - The *viewer* user only has viewing rights (this user cannot access the configuration menus). By default, the *viewer* user has no password. This allows anyone to view the images on the camera without being prompted for a password. If you want to block public access to the live image, you will need to change the password for the *viewer* user.

To modify the password of an existing user, click on the user name and then type in a new password in the password field (retype it in the verify password field). Then click the Add/Modify button.

Tip: *Do not forget your password. If you do, you will have to open the top half of the camera case and press the Defaults button on the circuit board.*

Adding a New User

To add a user to the Users list, type in the desired username in the Name field. Type and retype a password in the Password fields. Click the Add/Modify button. New users will only have viewing rights; only the *admin* user can make configuration changes in the camera.

Deleting a User

To remove a user from the Users list, click on the desired username and click on the Remove button. Note: The default users, *admin* and *viewer*, cannot be removed.

3.10 Advanced Menus

The advanced menu allows you to configure some advanced features inside the camera such as Triggers and Dynamic DNS support.

3.11 Miscellaneous

Reboot Camera

Click this to reboot the camera.

Upgrade Firmware

Allows you to select a new firmware and upgrade the camera. You can also use the StarDot Tools software to upgrade the firmware. It is recommended that you clear the configuration settings before upgrading (see config section in the manual).

3.12 Manual Config

Configuration Files

This advanced menu provides access to all of the configuration files in NetCam SC. We recommend that you do not edit these files unless you are well versed in Linux and the NetCam SC camera settings.

3.13 PTZ

The NetCamSC is capable of controlling Pan/Tilt/Zoom hardware via the RS-232 port. Some PTZ hardware requires an RS-485 connection. If this is the case, you can use an RS-232 to RS-485 converter.

ENABLED

This option must be enabled in order for PTZ control to occur.

Camera

If this is a multi-input device (i.e. video server), select the camera.

Type

Select the appropriate PTZ protocol.

Connection

Select the appropriate serial port.

3.14 Dynamic DNS

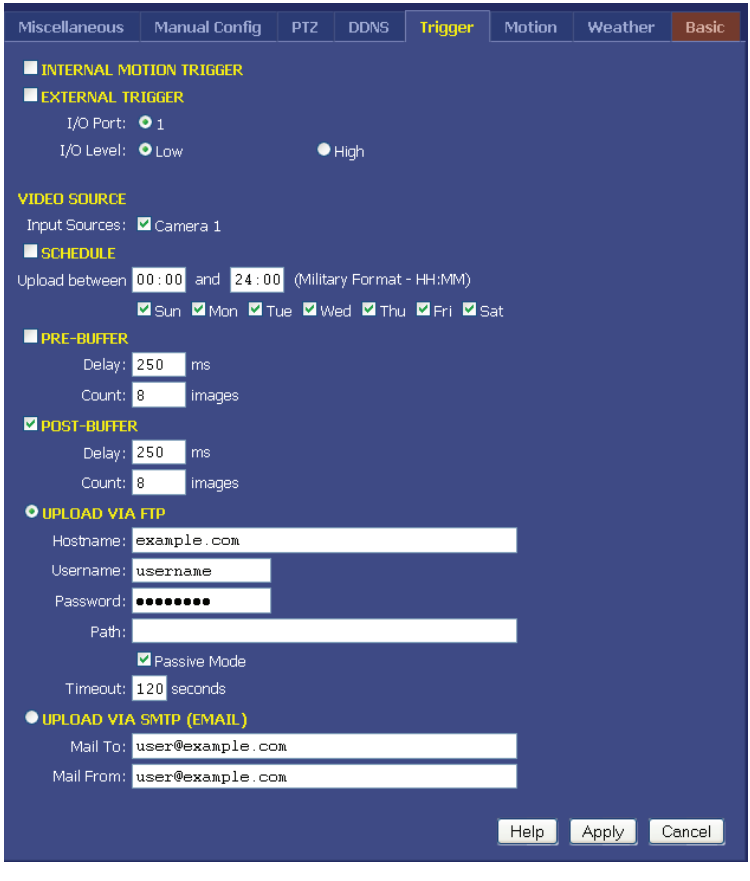
If NetCam SC is behind a DSL or cable modem connection and the public IP address changes, you can use tzo.com as a dynamic DNS service. This maps your dynamic (i.e. always changing) IP address to a static hostname of your choice (i.e. yourcompany.stardotcams.com or yourname.remotecam.com).

Why is knowing your public IP address valuable? If your router is configured to "port forward" port 80 to the camera's local IP address, you can browse to the camera directly from anywhere on the Internet. This is useful for viewing the camera live and making configuration changes from a remote location. For information on configuring port forwarding on a router, visit http://www.portforward.com, click on routers, select your model and click on "Default guide".

To set up a TZO account, visit http://stardot.tzo.com. After you've signed up, enter the appropriate information in either NetCam SC or your router (if it supports DDNS).

3.15 Trigger Properties

The trigger menu allows you set up NetCam SC to capture and upload a series of images based on a triggered event using the input ports on the back of the camera. After making changes, click the Apply button to save the settings in the camera.



Trigger Overview

By connecting an alarm system, motion detector or other type of sensor to the back of NetCam SC, it is possible to gather a series of images when the sensor "triggers" the camera.

TRIGGER

I/O Port

Select with I/O port your trigger source is connected to. NetCam SC only has I/O port 1.

I/O Level

Select the state of the trigger source's output.

SCHEDULE

NetCam SC can wait in trigger-capture/upload mode 24 hours a day, seven days a week, or you can set whatever time window and days of the week you like. Use military time for the beginning and ending window times.

Example: You can configure the camera to only upload Between 07:30 and 18:30 only on Monday, Tuesday, Wednesday, Thursday and Friday.

PRE-BUFFER

Pre-buffered images are images that are stored before the event trigger occurs. For example, if you connect an alarm system to the camera with 10 image pre-buffering enabled, 10 frames of video that occurred before the alarm was triggered will be captured/uploaded.

If pre-buffering is enabled, the camera will continuously buffer images in a rotating loop. This will affect the video speed if you'd like to view live streams at the same time. Most applications don't require pre-buffering. Only enable this option if you require video frames before the trigger takes place.

Delay

The number of milliseconds to delay between image captures. For the fastest possible frame rate, set this to 33. Here are some example frames rates for a single triggered video source:

33 ms = 30 frames per second (Max Speed)
250 ms = 4 fps
1000 ms = 1 fps

Count

The number of pre-buffer images to store. There is a finite amount of memory in which to store images. Keep the total number of pre and post-buffer medium resolution images to below 50, even less for full size images.

POST-BUFFER

Post-buffered images are images that are recorded after a triggered event occurs. For example, if you connect a door sensor to the camera with 20 image post-buffering enabled, 20 images will be captured/uploaded after the door opened.

Delay

The number of milliseconds to delay between image captures. For the fastest possible frame rate, set this to 33. Here are some example frames rates for a single triggered video source:

33 ms = 30 frames per second (Max Speed)
250 ms = 4 fps
1000 ms = 1 fps

Count

The number of post-buffer images to store. There is a finite amount of memory in which to store images. Keep the total number of pre and post-buffer medium resolution images to below 50, even less for full size images.

UPLOAD VIA FTP

If you'd like the event-triggered image captures to be uploaded to an FTP server, select this option. The "Upload via FTP" parameters are independent of the regular image FTP parameters (see Chapter 3.5).

Hostname

The hostname is the name of the server where you'd like NetCam to upload images to. It can be a machine name or an IP address.

Example: `example.com` or `ftp.example.com`

Username

This is the username or login name assigned to you by your hosting provider.

Password

This is the password assigned to you by your hosting provider

Path

Specify the path on your FTP server where you'd like the images stored. There is no need to specify a filename. NetCam SC automatically creates sequential filenames (image0-000.jpg, image0-001.jpg, image0-002.jpg, etc.).

Passive Mode

If NetCam SC is behind a proxy server, enable passive mode. If you are unsure if you need passive mode, it is usually safe to enable it anyway.

Timeout

If the FTP process hasn't completed within the time specified here, the NetCam will attempt to restart the process.

Default: `120`

UPLOAD VIA SMTP (EMAIL)

If you prefer the event-triggered image captures be e-mailed, select this option. If you've enabled a large number of images, this can add up to a large e-mail attachment.

Mail To

Specify the e-mail address you prefer NetCam to send the images to.

Mail From

Specify a "from" e-mail address.

TRIGGER SENSOR CONNECTOR

The I/O connector contains one opto-isolated trigger input and one relay connection.

Pins 1 and 2 are an opto-isolated input, providing 2500VRMS isolation. To trigger, apply positive voltage to pin 1, and negative or ground to pin 2. The trigger voltage should be 3.5VDC to 12VDC, 1.4mA minimum. You may connect directly to a 12VDC alarm system, door sensor, etc. but the polarity must be correct or you risk the possibility of false triggers.

Higher voltages may be used as long as the power used by the internal 1.5K resistor does not exceed 1/4W. Here are some resistor values you can use in series with pin 1, to trigger from voltages higher than 12V:

12V to 16V = 2.7K
16V to 26V = 5.1K

Additional values can be calculated from:

Resistor (ohms) = (Input Voltage) x 357 - 1893

Pins 3 and 4 are the relay, which can handle 2A @ 28VDC. It is good for 100,000 cycles at maximum load, 100 million when unloaded. The camera can close or open this relay to turn on lights or other external devices. For example, you could unlock a door after

seeing who rang.

The relay is also rated for 0.5A @ 125VAC, however it should never be used to directly control AC voltages from the wall outlet. It will wear out rapidly and may result in sparking with risk of fire. Switching mechanisms designed for controlling wall outlet power, which can be triggered from a low DC voltage, are available.

Technical Support

Technical support for NetCam SC customers is available directly from StarDot Technologies. Answers to most questions can be found at our web site at http://www.stardot.com.

Technical Support and Software/Firmware Downloads

http://www.stardot.com

Technical Support via E-mail

help@stardot.com

Technical Support via Phone

(714) 228-9282, 8AM - 5PM PST, Monday-Friday

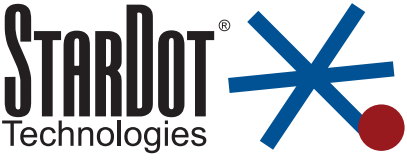
NOTES

Specifications

TECHNICAL SPECIFICATIONS	
Image Sensor	All Models: RGB, CMOS, Frame Transfer, Up to 30 FPS 5MP: 2592x1944 / 3MP: 2048x1536 / 1.3MP: 1296x976
Sensitivity	0.3 lux Color (with ƒ1.2 iris), 0 lux in IR mode (w/ IR illuminator)
Exposure	Auto exposure with brightness adjustment and grid exposure selection or manual exposure (1/48,000 second ~ 1.3 seconds)
Imaging Features	Auto/manual color balance (including skew override), contrast enhancement (haze subtraction, gamma correction) and sharpening, defective pixel replacement
Image Compression	Industry Standard JPEG and Motion-JPEG (adjustable quality/compression)
Frame Rate	10/12 FPS ~ 30+ fps, depending on resolution
Typical File Sizes	320x240 (8~20KB) 640x480 (25~70KB) 1296x960 (50~200KB) 2592x1944 (150-300KB)
Network Connection	1 x 100-baseT Ethernet, PoE (802.3af)
Network Protocols Supported	TCP/IP, HTTP, FTP, DHCP, PING, TELNET, DAYTIME, NTP, SMB, NFS
Serial Connection	1 x RS-232 Ports, DB9, up to 115.2Kb/sec
Internal Memory	32MB DRAM, 4MB Flash Memory, 32MB Imaging Buffer
Internal Operating System	uClinux
Security	Separate password-protected user accounts for administering the server and viewing the images, additional user accounts can be added
Operating Temperature	-40°F to +120°F (-40°C to +48°C)
Dimensions	5.9” Diameter (150mm) x 4.7” H (120mm)
Weight	44 ounces (1247 grams)
EMI Approval	FCC Class A, CE (EN55024/1998, EN55022/1998)
Power Requirements	PoE (48VDC) or 10VDC - 20VDC (500mA@12V) or 24VAC

FCC STATEMENT OF COMPLIANCE

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.



6820-H Orangethorpe Ave
Buena Park, CA 90620 U.S.A.
714-228-9282 • Fax: 714-228-9283
E-mail: info@stardot.com
http://www.stardot.com

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